

**SYSTEM AND METHOD FOR PASSIVELY
ALIGNING AND COUPLING OPTICAL DEVICES**

ABSTRACT OF THE DISCLOSURE

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An external mode size transformer includes a waveguide having an input section, an output section, and a tapered section disposed between the input and output sections. The cross sections between the input and output sections of the waveguide can vary smoothly throughout the length of the waveguide, similar to a waveguide shaped like a boat hull. By positioning the external mode size transformer between optical devices, coupling between optical devices is substantially improved compared to that of direct coupling. For example, by positioning the external mode size transformer between a laser and an optical fiber, laser to fiber coupling is significantly improved compared to that of direct coupling between these optical devices. The present invention can include a manufacturing method that employs multiple masks with predetermined shapes to fabricate the sections of the waveguide within a planar substrate via an exemplary ion exchange process.

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